UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,200	10/28/2003	Mark E. Zachman	SPC 0378 IA/40719.773	4518

7590 02/15/2006

DINSMORE & SHOHL LLP
One Dayton Centre
Suite 500
Dayton, OH 45402-2023

EXAMINER	
ADDIE, RAYMOND W	
ART UNIT	**PAPER NUMBER**
3671	

DATE MAILED: 02/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

MAILED

FEB 15 2006

GROUP 3600

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/695,200
Filing Date: October 28, 2003
Appellant(s): ZACHMAN ET AL.

William Jividen
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/30/05 appealing from the Office action mailed 5/24/05.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter The summary of claimed subject matter contained in the brief is correct.

Although Applicant's use of the title heading "Summary of the Invention" is improper; it does not constitute sufficient cause to hold the brief defective. Should Appellant file a Reply Brief, a corrected heading is advised.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Objections

1. Claim 2 is objected to because of the following informalities:

Claim 2 recites the method step of "measuring a desired grade with the gravity-based cross slope sensor; and storing the desired grade in memory of the control system". That does not define the desired grade being measured and stored. As written, it appears as though there is no limit to the various different "desired grades" that can be measured and stored. However, the specification, particularly page 3 lns. 10-20 only provides that "the desired grade of the cross slope sensor is measured and stored in memory of the tool's control system...That is, the cross slope sensor provides a relative measurement of the interrupted laser receiver which, when coupled with the absolute measurement of the uninterrupted laser receiver, provides an estimate of the absolute position of the interrupted laser receive(r)".

Hence, it is clear that only the cross-slope of the sensor itself, as it relates to the cross-slope of the screed head, is the desired grade being measured and stored;

and does not include measuring the grade of the soil at the construction site receiving the concrete being leveled.

Thus, the cited phrase from claim 2 should be --measuring the current transverse grade of the gravity-based cross slope sensor; and storing said grade in a memory device of the control system.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hohmann, Jr. # 5,556,226 in view of Clegg # 4,807,131 and Burgin # 3,816,937 discloses an automated laser aligned leveling screed and method of use comprising:

Controlling movement of individual, hydraulically moveable ends (17, 2nd end not numbered) of a screed head (15) so as to maintain a substantially horizontally-level, elevational position between each end of the screed head (15) and an elevational reference (59, 61).

Providing a control system (67) controlling the hydraulically moveable, 1st and 2nd ends of the screed head.

Providing a pair of laser receivers (51, 53) to the screed head (15), in communication with the control system (67).

Setting the pair of laser receivers (51, 53) in an appropriate dead band with the elevational reference. See col. 5, lns. 43-54.

Detecting a "column block" situation, wherein at least one laser receiver (51, 53) is obstructed from the elevational reference (59), and maintaining the screed head (15) in a substantially horizontally level orientation. See col. 3, ln. 1-col. 5, ln. 67.

What Hohmann, Jr. does not disclose is maintaining the screed head (15) in an orientation approximately parallel with a desired transverse slope, such as is needed in banked curves on roads and drainage sloped in concrete slabs and floors.

However, Clegg teaches a fully automated earth-working machine and method of controlling the transverse cross-slope of a leveling implement (32) utilizing multiple sensor systems, such as laser receivers and beacons (12, 10) respectively, in combination with either distance or angle measuring instruments, such as gyroscopes or inertial detectors such as cross slope angle detector (35). Clegg explicitly recites the desirability in combining multiple sensor technologies, in order to take advantage of each systems unique abilities, such that the "interconnection, interaction and interrelationship of such devices is novel and working together, accomplish results not previously accomplished".

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the method of controlling a leveling device of Hohmann, Jr., with the method of combining cross-slope sensors with laser elevation detectors, in order to maintain a desired, non-horizontal transverse slope
of the leveling device, as taught by Clegg, in order to accomplish leveling results not previously accomplished. See Clegg, col. 7, ln. 37-col. 9, ln. 56; col. 10, ln. 49-col. 11, ln. 26.

Unfortunately Clegg does not disclose what types of cross-slope sensors could be utilized to measure and produce a signal representing the cross-slope of the leveling tool. However, Burgin teaches gravity-based cross-slope sensors are advantageously used with a slope control console, which can be secured to a paver such that the sensor can sense the inclination of a leveling tool, such as a screed head (E), relative to a predetermined slope, since the sensor can be directly attached to the screed head (E). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the method of controlling a leveling device, during a column block situation of Hohmann, Jr., with the method steps of providing and attaching a gravity based cross slope sensor directly to a leveling device, as taught by Clegg and Burgin, in order to maintain the cross slope of the leveling device, with respect to a desired cross-slope, such that the level of accuracy (overall smoothness) of the leveled concrete is greater than that previously achievable. See Burgin col. 2, ln. 51-col. 5, ln. 47.

In regards to claim 2 Hohmann, Jr. teaches a known problem exists when laser receivers of a concrete leveling device is blocked from receiving a reference beam. What Hohmann, Jr. does not disclose is providing a gravity based cross slope sensor to measure and store a current transverse grade of the leveling device. However, Clegg teaches the use of a processing system including a cross slope sensor (35) such that the actual cross slope angle, at which the leveling device is grading a surface, being measured by a cross-slope detector (35) the output of which is encoded in digital form in encoder 35a or to a central processing unit for the system shown at (120). for comparison to a desired final grade of the leveling device at any given point on the site.

Further Burgin teaches a cross slope sensor, in the form of a gravity-based cross slope sensor and method of using said gravity based sensor to measure the transverse slope of a paving device. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the method of controlling a leveling device in a column block situation, with the method step of measuring the current cross slope of a leveling device, with a gravity based cross slope sensor as taught by Clegg and Burgin, in order to maximize the smoothness of the leveled concrete.

3. Claims 3-5, 7-11, 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hohmann, Jr. # 5,556,226 in view of Clegg # 4,807,131.

Hohmann, Jr. discloses a control system for controlling movement of individual, hydraulically moveable ends (17, 2nd end not numbered) of a screed head (15) so as to maintain a substantially horizontally-level, elevational position between each end of the screed head (15) and an elevational reference (59, 61) as the screed head is moved toward the machine (1). Said control system comprising:

1st and 2nd elevation receivers (51, 53) mounted on respective 1st and 2nd ends and providing signals indicating the position of the 1st and 2nd ends of the screed head (15) in relation to an elevational reference (59, 61).

Hohmann, Jr. further discloses a known problem exists when one of the laser receivers is prevented from receiving the reference laser beam (59).

What Hohmann, Jr. does not disclose is the use of a cross slope sensor and a control circuit responsive to laser receivers and cross slope sensors, to maintain the screed head in an other than horizontal orientation. See col. 4, ln. 23-col. 5.

However, Clegg teaches a fully automated earth-working machine capable of controlling the transverse cross-slope of a leveling implement (32) utilizing a control circuit (50, 52, 140, 120), which is capable of receiving signals from multiple sensor systems, such as laser receivers and beacons (12, 10) respectively, in combination with either distance or angle measuring instruments, such as gyroscopes or inertial detectors such as cross

slope angle detector (35). Such that the signal from the cross slope sensor (35) remains substantially constant; whereby the transverse slope also is maintained substantially constant. Clegg explicitly recites the desirability in combining multiple sensor technologies, to maintain a desired transverse slope of the leveling device, in order to take advantage of each systems unique abilities, such that the "interconnection, interaction and interrelationship of such devices is novel and working together, accomplish results not previously accomplished".

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the paving machine of Hohmann, Jr. with a cross slope sensor and control system capable of receiving signals from both laser receivers and cross slope sensors, as taught by Clegg, in order to maintain a desired transverse slope of a leveling device, when one of the sensor systems is not functioning properly; as reasonably suggested by Clegg. See cols. 9-11.

In regards to claims 5, 10 Hohmann, Jr. discloses the claimed invention as put forth with respect to claim 3 above for controlling movement of individual hydraulically moveable ends of a screed head carried by a boom of a machine so as to maintain a horizontal position between each end of the screed head and a reference (59, 61) in a concrete paving application as the screed head is moved toward the machine; but does not disclose utilizing additional sensor systems and control circuit capable of receiving

signals from additional sensors. Clegg explicitly recites the desirability in combining multiple sensor technologies, to maintain a desired transverse slope of the leveling device, in order to take advantage of each systems unique abilities, such that the "interconnection, interaction and interrelationship of such devices is novel and working together, accomplish results not previously accomplished". To include the use of relative motion signal generators and inertial detectors, which is seen to include inclinometers. See col. 12, lns. 1-20.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the paving machine of Hohmann, Jr. with a cross slope sensor and control system capable of receiving signals from both laser receivers and cross slope sensors, as taught by Clegg, in order to maintain a desired transverse slope of a leveling device, when one of the sensor systems is not functioning properly; as reasonably suggested by Clegg. See cols. 9-11.

In regards to claims 7, 8 Hohmann, Jr. disclose the use of laser beacons and laser receivers.

In regards to claims 13, 15, 16 Hohmann, Jr. discloses a method of controlling the elevational position of hydraulically moveable ends of a tool in relation to a reference detected by elevation receivers (51, 53), such as laser receivers attached to longitudinal ends of the screed head (15), the method comprising:

Selecting a desired elevational position of the screed head (15) with respect to a laser reference beam (59).

Controlling the elevational positions of the ends of the tool using the sensed positions of the ends of the tool in relation to the reference laser beam when both are known.

Hohmann, Jr. further discloses a known problem exists when one of the laser receivers does not receive an elevational reference beam (59).

What Hohmann, Jr. does not disclose are the steps of measuring the positions of the ends of the tool in relation to a reference, and sensing the cross slope of tool.

However, Clegg teaches a fully automated earth-working machine and method of controlling the transverse cross-slope of a leveling implement (32) utilizing multiple sensor systems, such as laser receivers and beacons (12, 10) respectively, in combination with a cross slope angle detector (35).

The method comprising the steps of:

Sensing with the elevational receivers (12) the positions of the ends of the tool in relation to a laser reference beam.

Sensing the transverse slope of the tool with a cross slope sensor (35).

Controlling the elevational ends of the tool using at least one signal from a laser receiver (12) and the cross slope sensor signal to maintain the tool in a desired transverse slope.

Further, Clegg explicitly recites the desirability in combining multiple sensor technologies, in order to take advantage of each systems unique abilities, such that the "interconnection, interaction and interrelationship of such devices is novel and working together, accomplish results not previously accomplished". Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the method of controlling a leveling device of Hohmann, Jr., with the method of combining cross-slope sensors with laser elevation detectors, in order to maintain a desired, non-horizontal transverse slope of the leveling device, as taught by Clegg, in order to accomplish leveling results not previously accomplished. See Clegg, col. 7, ln. 37-col. 9, ln. 56; col. 10, ln. 49-col. 11, ln. 26.

In regards to Claim 14 Hohmann, Jr. discloses a method of controlling laser-guided screed heads, during a column block situation, wherein during retracting of the screed head on the boom, a laser beacon is known to become blocked from a laser receiver on one of the ends of the screed head. Hohmann, Jr. explicitly discloses "As the screed is moved around the floor (this is seen to include retraction and lateral motion of the boom)...the vertical support columns frequently block the laser beam...and it disrupts the automatic operation of the laser screed...The operator must immediately assume manual height control of the affected screed end when the column block light is illuminated...until the sensor moves into a position where it is unblocked (which is seen

to include retraction and lateral motion of the screed head, as is normal operation of the paving machine. Hence, it would have been obvious to the method of controlling a laser guided screed head during a column block situation of Hohmann, Jr. to terminate control of the ends of the screed head and assuming manual control of the screed head, to complete retraction of the screed head, past the building column causing the "blocked sensor" until the sensor moves into a position where it is unblocked, includes retraction and lateral motion of the screed head, since both motions are commonly necessary to clear the blocked sensor. See col. 2, lns. 33-col. 3, ln. 5.

4. Claims 6, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hohmann, Jr. # 5,556,226 in view of Clegg # 4,807,131 in view of Heiser et al. #4,925,340.

Hohmann, Jr. in view of Clegg discloses a control system of maintaining a non-horizontal orientation of a screed head for forming roads and the like having a desired cross section, to include the desirability to of utilizing combinations of sensor technologies such as laser receivers and gravity-type cross-slope sensors, but does not explicitly recite using a pendulum type cross-slope sensor. However, Heiser et al. teaches pendulum type cross-slope sensor are commonly used on paving machines, specifically to maintain a desired transverse slope of a leveling device (12) with respect to gravity, and is mounted directly on the leveling device to for maximum accuracy.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the paving machine of Hohmann, Jr. in view of Clegg, with a pendulum type cross slope sensor, as taught by Heiser et al., in order to form inclined concrete surfaces, to exacting specifications. See Heiser et al., Figs. 3, 4; Col. 2, ln. 30-col. 3, ln. 44.

(10) Response to Argument

Appellant's failure to address the objection to Claim 2, cited in the Last Office Action, is seen to be confirmation of the Examiner's interpretation of the scope of the method step required by Claim 2, as put forth on pages 13-16 of the last office action.

Thus the "desired grade" being measured is seen to be the instantaneous slope of the claimed "gravity based cross slope sensor" with respect to the screed head the sensor is mounted upon. And does not require the measuring of any adjacent grade, such as existing roadway, grade, subgrade or painted line or grade string.

Appellant is reminded the subject matter of the claimed invention has consistently been examined within the broadest, reasonable interpretation of the claims as put forth below.

The claimed method and control system is directed to the use of an undefined "gravity based cross-slope sensor", to control the ends of "an elongated tool" (cls. 9, 13) such as a "screed head" (cls. 1, 3).

The control system comprising:

A pair of elevation receivers mounted on respective ends of the tool, and capable of indicating the height of the tool.

A sensor (cl. 3, 9) for sensing the lateral cross-slope of the tool.

A control circuit, responsive to the elevation receivers and to the sensor for controlling the hydraulically moveable ends of the tool.

Wherein the control circuit is capable of using the signal provided by the elevation receivers, when available and also capable of using the signal from the cross slope sensor, when the signal from one of the elevation receivers is not available.

From the broad nature of the actual claim language is vague, to the extent neither the scope of the elevation receivers, the cross slope sensor nor the control circuit is actually defined by the independent claims.

Not until dependent claims 5-8, 10-12 are the features required to be in the form of "a light detector" such as a laser receiver, "an inclinometer", such as a pendulum sensor with a low pass filtered output required.

To that extent; Hohmann, Jr. # 5,556,226 in view of Clegg # 4,807,131 were cited for there teaching of commonly known, grading tools and control system for accurately positioning of the tools.

Hohmann, Jr. discloses a control system for a screed head (15) so as to maintain a horizontally-level, position between each end of the screed head (15) and an elevational

reference (59, 61) as the screed head is moved toward the machine (1). Said control system comprising:

1st and 2nd elevation receivers (51, 53) mounted on respective 1st and 2nd ends of the screed head (15) in relation to an elevational reference (59, 61).

Hohmann, Jr. further discloses a known problem exists when one of the laser receivers is prevented from receiving the reference laser beam (59). See col. 4, ln. 23-col. 5.

Clegg explicitly recites " Generally speaking, however, it is desirable to use two or three types of signal generating devices, taking advantage of the particular precision and flexibility of each. Distance from reference points may be determined, for example, using electronic distance measuring devices which rely upon infrared or other radiation reflection and may use doppler effect to measure velocity as well."
See Col. 8, ln. 8-26.

Thus Clegg clearly teaches the advantageous use of laser receiving and electronic distance measurers (EDM), such as radar and ground wave signal generators.

Hence, it would have been obvious to one of skill in the art, armed with the disclosure of Hohmann, Jr. in view of Clegg, to correct a known problem disclosed by Hohmann, Jr., with a device not subject to the weakness of the laser receivers, as taught by Clegg, in order to take advantage of the unique advantages and flexibility of each technology in providing the most accurate leveling of the material being formed.

With respect to dependent claims 6, 12 which require the use of a pendulum sensor, Hohmann, Jr. in view of Clegg clearly teach the use of a laser screed in combination with any of a wide variety of known technologies to control the ends of the grading tool,

But do not explicitly teach the use of a pendulum sensor. However, Heiser et al. teaches pendulum type cross-slope sensor are commonly used on paving machines, specifically to maintain a desired transverse slope of a leveling device (12) with respect to gravity, and is mounted directly on the leveling device to for maximum accuracy.

Hence, it appears as though the cited prior art has been put forth in a manner to demonstrate the obviousness of broadly claimed invention, and an obvious method of using the disclosed device.

However, the Appellant furthers the presumption of patentability by 1st describing the grounds of the Examiner's rejection, on pages 6-15 of Appellant's Brief, to which the Examiner withholds comment.

On pages 16-26 Appellant argues against the 35 U.S.C. 103(a) rejections of claims 1-17 by suggesting:

1.) A *prima facie* case of obviousness has not been made. Based on the suggestion the Examiner had;

2.) Improperly utilized an "obvious to try" rationale to support the rejections. And;

3.) Improperly engaged in "hindsight reasoning" by gleaming certain information only from Appellant's disclosure.

With respect to the rejection of claims 1, 2 as being unpatentable over Hohmann, Jr., in view of Clegg and Burgin; Appellant argues "Hohmann, Jr. fails to disclose or

suggest either the use of 'a pair of laser receivers and a gravity-based slope sensor' or 'using the gravity-based cross slope sensor when one of the laser receivers loses reception'...Clegg's general statement provides no teaching or suggestion that would lead one...to modify the control system of Hohmann, Jr. as suggested by the Examiner...One cannot base obviousness upon what a person...might try or might find obvious but rather must consider what the prior art would have led a person...to do".
On page 19, of the brief, Appellant utilizes 1, of many embodiments disclosed by Clegg, to show non-obviousness of the claimed method.
Appellant then argues on Page 20 of the brief, that "Burgin is silent on using an alternative sensor upon losing reception by one of the laser receivers".

However, the Examiner does not concur.
As cited above, Hohmann, Jr. not only discloses a Laser Screed mounted on a boom of a prime mover, but also discloses it is a known problem to controlling the screed head, when at least one of the laser receivers (51, 53) is prevented from receiving a laser beacon signal. See col. 2.

Clegg was cited for its teaching of using any combination of known technologies, and a control system capable of selectively utilizing signals generated by devices using said different types of technology, to take advantage of the precision and flexibility of each type of technology.

Clegg explicitly recites "As will be described, the laser detector generates a signal indicative of the elevation of the grading tool, the blade 32 as shown in FIG. 1. The grading tool is mounted on the earth moving machine and is provided with tilt and elevation controls 34, and a tilt or cross slope angle indicator 35 which measures the cross slope angle of the blade relative to horizontal, and also with angular orientation controls 36. These control mechanism are, in themselves, conventional hydraulic rams, gear mechanism and other well-known electrical, electro-mechanical and mechanical devices; however, the interconnection, interaction and interrelationship of such devices is novel and, working together, accomplish results not previously accomplished.
See Col. 11, lns. 11-26.

Hence, it can be seen Clegg clearly teaches it is advantageous and known to combine known technologies, with a control system receptive to each type of technology, and capable of maintaining a desired slope of a screed head, or other leveling/grading tool Taking advantage of the unique precision and flexibility of each technology.

Further, Burgin was cited for its teaching to use pendulum type gravity based slope sensors for controlling cross-slope of a leveling device.

Therefore, the arguments are not persuasive and the rejection is maintained.

Appellant then argues against the rejection of claims 3-5, 7-11, 13-17 as being unpatentable over Hohmann, Jr. in view of Clegg by putting forth the same arguments cited above.

To which, the Examiner redirects attention to the answers above.

Appellant then argues against the rejection of claims 6, 12 by suggesting Hohmann, Jr. in view of Clegg and further in view of Heiser et al. fails to establish a *prima facie* case of obviousness by suggesting "Hohmann, Jr. fails to disclose...the use of a pair of elevation receivers and a sensor for sensing slope of a screed head, or a control circuit responsive to...an inclinometer".

Appellant further argues Claim 6 depends from claim 5...Clegg is silent on using a gravity based sensor or any alternative sensor to control the height...upon losing reception by one of the laser receivers...Heiser et al. likewise also is silent on using an alternative sensor upon losing reception by one of the laser receivers".

However, the Examiner does not concur.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Appellant clearly argues the primary reference fails to teach that which is taught by the secondary references and that the secondary references fail to disclose that which is disclosed by the primary reference. However, both Hohmann, Jr. and Clegg both disclose the use of laser beacons and receivers to control the height of a grading tool.

Hohmann, Jr. further teaches it is known laser receivers on occasion are unable to detect a laser beacon light which causes loss of control to the side of the screed head without laser detection. Clegg teaches it is known to combine laser receivers with any of a wide variety of slope sensors (35), to measure the cross slope of the grading tool and providing a control system responsive to each type of device. Heiser et al. teaches pendulum type cross-slope sensor are commonly used on paving machines, specifically to maintain a desired transverse slope of a leveling device (12) with respect to gravity, and is mounted directly on the leveling device to for maximum accuracy.

Therefore the arguments are persuasive and the rejection is maintained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Raymond Addie

Conferees:
TW
DJ

12/10/05